

## ABSTRACT OF THE DISCLOSURE

[0196] Audio information stored in the undulations of grooves in a medium such as a phonograph record may be reconstructed, with little or no contact, by measuring the groove shape using precision metrology methods coupled with digital image processing and numerical analysis. The effects of damage, wear, and contamination may be compensated, in many cases, through image processing and analysis methods. The speed and data handling capacity of available computing hardware make this approach practical. Two examples used a general purpose optical metrology system to study a 50 year old 78 r.p.m. phonograph record and a commercial confocal scanning probe to study a 1920's celluloid Edison cylinder. Comparisons are presented with stylus playback of the samples and with a digitally re-mastered version of an original magnetic recording. There is also a more extensive implementation of this approach, with dedicated hardware and software.